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THE PRELIMINARY PERSONNEL DATA BASE DESIGN FOR THE  
INDONESIAN NAVY(U) NAVAL POSTGRADUATE SCHOOL MONTEREY  
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# NAVAL POSTGRADUATE SCHOOL

Monterey, California



## THESIS

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The Preliminary Personnel Data Base Design  
for the Indonesian Navy

by

Moedjiono

June 1982

Thesis Advisor: Norman F. Schneidewind

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
AD-A121955		
4. TITLE (and Subtitle) The Preliminary Personnel Data Base Design for the Indonesian Navy		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; June 1982
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Moedjiono		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, Ca. 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, Ca. 93940		12. REPORT DATE June 1982
		13. NUMBER OF PAGES 72
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Naval Postgraduate School Monterey, Ca. 93940		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Data Base                      Systems analysis Data model                    Systems design Data management            Personnel management Data dictionary              Career		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  Currently the Indonesian Navy Computer Center (Dispullahtal) has a need for a Personnel Data Base System which satisfies all of the required applications. By analyzing the aspects of the personnel management in the Navy and the functions required to implement the management policies, the author has determined the data		

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Justification	
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Availability Codes	
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The Preliminary Personnel Data Base Design for  
the Indonesian Navy

by

Mcedjiono  
Captain, Indonesian Navy

Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN COMPUTER SCIENCE

from the  
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## ABSTRACT

Currently the Indonesian Navy Computer Center (Dispullahtal) has a need for a Personnel Data Base System which satisfies all of the required applications. By analyzing the aspects of the personnel management in the Navy and the functions required to implement the management policies, the author has determined the data elements' relationships. Further, from the data elements' relationships and using logical Data Base model design methods, the author has derived a Personnel Data Base model. Topics discussed include: transformations of data elements between their logical views and physical representation, security, Data Base dictionary structure and characteristics, journalizing transactions to facilitate Data Base recovery, and Data Base administration. The author's efforts indicate that the Personnel Data Base presented herein is worthwhile and should be implemented. This involves the organization and formation of a Data Base Administration, and continuation and completion of the design.

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## ACKNOWLEDGEMENT

The author would like to acknowledge the assistance of Dispullahtal (Indonesian Naval Computer Center) which provided the supporting data and references needed for this thesis research; the aid of Professor Norman F. Schneidewind and Professor Norman R. Lyons in supervising this thesis research; and the help of Captain Peter L. Jones for assisting in the editing of this thesis.

## I. INTRODUCTION

Since 1977 Dispullahtal (Indonesian Navy Computer Center) has worked at developing a Personnel Data System (PDS) with emphasis on collecting data, and then processing and presenting information<sup>1</sup> to users (especially the top management) as it is needed to facilitate decision-making.

The data which has been collected by Dispullahtal using PDS for each person employed by the Department of Navy, both military and civilian, comes primarily from Janminpersal (Department of the Navy Personnel Administration) as well as other departments involved with personnel administration and treatment. After its collection, the data is stored in files which are related to the various applications in the PDS. Currently the PDS only includes the functions of data storage and information retrieval. Since 1977 Dispullahtal has succeeded in convincing the system's users that their needs can be served and that now is the time to expand the PDS. The period for this expansion has been designated as "Data Mechanization." The users have come to realize that they depend on Dispullahtal for the processing of data and reporting of information which is timely and accurate. Prior to 1979, the system was not able to provide these services in the manner required because of the lack of up-to-date

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<sup>1</sup>Within the context of this thesis, Data and Information are meant to have two distinct meanings. Data refers to facts collected from observations or measurements, or refers to the values physically recorded in the file or Data Base. Information refers to the meaning assigned to those fact and values as a result of interpretation, correlation, etc. of data. Data is processed into information so that it can be understood and employed by users. [Ref. 3]

information in the system's files. Seeing this problem, the Navy conducted a census of its personnel in 1979 and this data is currently being integrated into the system.

According to the current user requirements, Dispullahtal should be able to respond immediately, and at any time, with information such as historical data (e.g historical rank, education, profession etc.) on any individual. For these requirements Dispullahtal has started organizing all the data into a Data Base System. This leads to the next phase of Dispullahtal's planning which is "Automation."

Data Base Systems are needed for accomplishing the requirements and demands because information is only of value so long as it supports the decision-making process and results in better decisions. To be useful for decision-making, information must be current. For the information to be current, the data on which it is based must also be current. Current, accurate information is essential for the effective operation of an organization. Therefore, it is necessary to have a means of collecting, organizing, storing, and correlating the data and to be able to extract and distribute the information as it is needed.

C. J. Date [Ref. 3] defines a Data Base system as

a computer-based recordkeeping system; that is, a system whose overall purpose is to record and maintain information. The information concerned can be anything that is deemed to be of significance to the organization the system is serving--anything, in other words, that may be necessary to the decision-making processes involved in the management of that organization. ... Data Base system involves four major components: data, hardware, software and users.

Date further defines a Data Base as

a collection of stored operational-data<sup>2</sup> used by the application systems of some particular enterprise.<sup>3</sup>

-----  
<sup>2</sup>operational-data would probably include: product data, account data, patient data, student data, planning data.

A Data Base system provides the enterprise with centralized control of its operational data. Some of the advantages that accrue from this centralized control are:

- Redundancy can be reduced,
- Inconsistency can be avoided,
- Data can be shared,
- Standards can be enforced,
- Security restrictions can be applied,
- Integrity can be maintained, and
- Conflicting requirements can be balanced.

Based on these above mentioned advantages, personal experience in processing personnel data prior to coming to the Naval Postgraduate School, and information gained from courses taken recently at this school, this author is attempting to design "The Elementary Personnel Data Base System for the Indonesian Navy". This Data Base System is proposed in order to fulfill some of the requirements of the Management Information System (MIS) in the Navy as posted in the "System Informasi Pembinaan TNI-AL" (Navy MIS).

To accomplish this goal, the author obtained information concerning user requirements from Dispullahtal. The three sections of this thesis are:

1. User requirements definitions which analyze the user requirements and data elements.

-----  
Enterprise is simply a convenient, generic term for any reasonably self-contained commercial, scientific, technical, or other type of organization. Some examples are: Manufacturing Company, Bank, Hospital, University, Government Department.

2. Data Base design which considers the data model and special discussions for further implementation.

3. Conclusions and recommendations.

At the end are appendices which contain the List of data elements from file system, Data Base Dictionary, and Data Base personnel tables.

Melvin B. Klein and Melvin W. Lifson [Ref. 9] in their lecture notes regarding Systems Engineering says that

A system, to be useful, must satisfy a need. However, designing a system to just meet the current need is not usually sufficient. With few exceptions, the system must be able to meet a continuing and changing need over a specified period of time in order to justify the investment in time, money, and effort.

It is the author's believed that the proposed system will be able to be easily improved according to the technological demands of the future.

## II. USER REQUIREMENTS DEFINITIONS AND ANALYSIS

### A. GENERAL

Wise personnel decisions demand data about the individuals upon which decisions may be based, the special requirements of jobs, and interactions between these two. Systematic procedures exist for gathering this data about people, jobs, job behavior; and for estimating their interrelationships. This should lead to the assurance that

the right people move into the right jobs at the  
right times and under the right circumstances.  
[Ref. 5]

Personnel decision-making is a never ending process, encompassing not only individual diagnosis and job analysis, but also job design, career guidance, and personnel development and training. People differ greatly from one another, but this fact does not carry implications about the static or dynamic nature of human abilities, needs, motives, and behavioral tendencies. In fact, the pervasiveness of both the inter- and intra-individual differences, and the temporal changes in human qualities are precisely why psychologists must take such special care in individual diagnosis as a basis for making sound personnel decisions. Scientific evidence about the individuality of people should supplant the hunches, arbitrary judgments, invalid rules of thumb, and methods of trial and error that unfortunately have characterized so many programs of personnel selection and job placement in the past. Learning about people systematically and scientifically is the best avenue toward wise and effective utilization of our human resources.

Marvin D. Dunnette [Ref. 5] calls

...personnel selection a gigantic casting process--a process in which auditions occur and in which human behavior is assessed, wisely or unwisely, validly or invalidly. Obviously, the fairness of such auditions and their relevance to performance is the central concern of the personnel decision maker.

Ideally, personnel decision making extends much further to include the possibilities for job redesign, counseling and guidance; the removal of organizational constraints; and the design of specialized training or development programs. Thus mapping the individuality of persons is necessary not only for personnel selection and placement, but for all other personnel programs as well.

The Indonesian Navy takes in hundreds of men each month; they must be placed into an extremely broad range of duty assignments, training programs, and schools. Each man inducted must be utilized somewhere in the system. The problem involves very detailed classification, and it is desirable for both the Navy and the men involved to ensure that assignment procedures successfully achieve a close match between human skills and job requirements.

## B. ASPECTS OF NAVAL PERSONNEL MANAGEMENT

The Management of the Navy's personnel system provides a means to activate the system, use it as a communication tool, conform to the social changes, and coordinate with the other sub-systems in the Navy. This management includes two major aspects, each with several subfunctions: (1) a manpower building aspect which includes functions involves planning and investigation, and (2) a personnel administration aspect which includes functions involving procurement, education and training, assignment, treatment, and separation.

## **1. The Manpower Building Aspect**

In personnel planning it must be determined what positions must be filled (what professions are needed) and what skills are needed to accomplish the required goals of the Navy's organization. Planning must take place on how to fill these positions either with personnel the Navy currently has or by procuring new personnel. To accomplish this it is necessary to carefully investigate or examine all of the relevant factors, internal and external, which influence the validity and success of this planning. Internal factors include all the problems which relate to the personnel system itself, while external factors are those which come from outside the Navy that directly and/or indirectly influence its personnel planning.

## **2. Personnel Administration**

This second aspect of personnel planning includes a number of sub-functions. They are:

### **a. Personnel Procurement**

Personnel procurement is the process of gaining manpower for filling vacant positions which cannot be filled from within the organization itself. Efficient procurement personnel must have information concerning the candidate's education, qualifications, experience, skills, etc. After candidates have been selected, their data can be kept and maintained so that it can be used at any time for transfer, new assignment, promotions, etc.



#### **b. Personnel Education and Training**

Information regarding the education and training of personnel is used mainly for personnel development and promotion. This information is used to match or minimize the difference between skills required to fill a position and the skills possessed by those who will occupy the position. A person's educational background can be used to gain special knowledge needed placing a person in a particular job and to prepare that person for a new assignment. Further, this information can be used to plan and monitor the careers of leaders, or those personnel with special abilities who will be future leaders, to extend their abilities and skills in preparation for future positions.

The results of personnel development can be measured by observing the performance of individuals in gaining necessary skills and abilities. This information can be recorded in the personnel data and used as a basis for further career development.

#### **c. Personnel Assignment**

Personnel assignment deals primarily with selecting the right people for the right positions. Two aspects must be considered:

(1) Every vacant position must be filled by a person with the ability to carry out the job in the best manner, and

(2) The abilities and skills of each person must be fitted to the job so that he feels satisfied with the job area.

In order to accomplish the above, it is necessary to have a profile of the skill/ability of each position, a

profile of the skill/ability of each person concerned, and a periodic evaluation of each person.

#### **d. Personnel Treatment**

Personnel treatment deals with the physical aspects of the person and the job. These include such things as mental and physical health, physical work and recreation, rewards, and personnel services. The latter benefits include transportation, salary, retirement plans and insurance, vacations and annual and sick leave, and cooperation between the worker and the employer.

#### **e. Personnel Separation**

Personnel separation occurs when the person voluntarily asks to be released from the military or goes through the process of retirement. Information about the people who are terminating must be completed in order for the personnel management system to give leads (directions) to other opportunities and fields. This can be beneficial to both the individual and to the system. If the person voluntarily leaves, the system should be able to gain valuable insights into ways of improving the Navy so as to reduce the number of voluntary separations.

### **3. Conclusions**

It can be clearly seen that the personnel management system must have a great deal of relevant information in order to proceed efficiently and effectively through all of the aspects involved. This supporting information must be complete and it must be up-to-date. This can be accomplished only if the relevant data is also complete and

up-to-date. Moreover, in order to meet the needs of all of the functions, management must also keep historical data such as rank, profession, education, etc.

It can also be seen that one function may need the same information as another function. For example, the education and training function needs information about the educational history of a person so that it can be used to fit/match an assignment or profession to that person. This same information would again be used at the time of separation for helping the person into a new position.

If each function were separately filed and managed, the information for each individual, there would be great duplication. In addition, if the data in one file changed, the data in the other files would also need to change; this would necessitate a great deal of time and energy in updating several files containing the same information. In order to prevent this duplication of files and to save time and energy, a Personnel Data Base is needed. This would be a collection of data, either historical or otherwise, which could be used in all functions of personnel management. Updating, inserting, and deleting of information could be performed only once. This would become the Personnel Data Base.

### C. TYPICAL USER REQUEST AND APPLICATIONS

Before discussing a typical Navy user information request, it is necessary to define what the user is in this system. According to C.J. Date [Ref. 3] there are three broad classes of users:

1. The application programmer, who is responsible for writing application programs which use the Data Base. These application programs operate on the data in all

the usual ways: retrieving information, creating new information, and deleting or changing existing information. The programs themselves may be conventional batch applications, or they may be on-line programs that are designed to support an end-user interacting with the system from an on-line terminal.

2. The end-user, who accesses the Data Base from a terminal. An end-user may employ a query language provided as an integral part of the system, or he or she may invoke a user-written application program that accepts commands from the terminal and in turn issues requests to the DBMS on the end-user's behalf. Either way the user may, in general, perform all the functions of retrieval, creation, deletion and modification, although it is probably true to say that retrieval is the most common function for this class of user.
3. The Data Base Administrator (DBA), who is the person (or group of persons) responsible for overall control of the Data Base system. This control includes:
  - a) Deciding the information content of the Data Base.
  - b) Deciding the storage structure and access strategy.
  - c) Making liaison with users.
  - d) Defining authorization checks and validation procedures.
  - e) Defining a strategy for backup and recovery.
  - f) Monitoring performance and responding to changes in requirements.

In this thesis the author defines the user according to the three classes mention above and according to who uses this Data Base.

According to the SIP-TNI-AL (Navy MIS) [Ref. 10], system's users include the following:

1. Headquarters level:

- a) Manager level,
- b) Staff level,
- c) Central executive level,
- d) Support level,
- e) Field technical executive.

2. Station level:

- a) Manager level,
- b) Staff level,
- c) Executive level: i.e., command executive, operational group, ship, Marine.

3. Extra Structural level: This level is the non-structured organization.

Based on the two major aspects of personnel system management and their breakdowns into functions, some examples of user requests and applications might include:

- 1. List all officers with rank of Colonel who have education at the Staff and Command College level, and have held command of a frigate ship.
- 2. List each Lieutenant Colonel's profession from Ensign through current profession, and their educations either military or general.

3. Recapitulate an officer's career from First Lieutenant through Colonel.
4. List the data characteristics of a person.
5. Present an information list for rank promotion purposes, listing the matrix value calculation. Include rank, profession, education, and security clearance.
6. Process the automatic monthly payments.
7. Show a list of family members (spouse, children, etc).

The output forms for this information are not included in this thesis, as they can vary. Also, the applications of this information may change and become more complicated according to the user requests.

#### D. DATA ELEMENTS AND THEIR GROUPINGS

A trend toward more integrated file structures has resulted in the grouping together of all data items relevant to the management and operations section of a user organization. The emerging Data Base concept requires placing all relevant data in one Data Base in a consistent and standardized manner, eliminating unnecessary duplication and file handling, and providing selective inquiry and extraction capabilities designed to meet a wide variety of information requests.

In order to meet the requirements, the author had to extract specific data elements from the 1979 Navy census and from the file system with minor modifications. The file system as it is currently structured contains 100 (one hundred) separate data elements which can be extracted. These data elements are posted in Appendix A.

After making analysis of them, eliminating some redundant or unnecessary duplications and adding some data elements which are needed for the Data Base model, the author has restructured the Data Base so that it now contains only 97 (ninety seven) data elements which are divided into two basic groups:

1. Data elements that are almost static in relation to others. These elements consist of data that will not be frequently changed. These data elements are also divided into two smaller groups:

a) Data elements which will frequently be used or retrieved by applications programs would be grouped in Main Identification. This group includes eight data elements: personnel serial number, name, corps, sex, birth's date, religion and tribe.

b) Data elements which would be seldomly retrieved by applications programs are grouped in Personnel Characteristics. This group would usually be used for intelligence purposes. This group is divided further into four subgroups:

i) Marriage subgroup (this group may be repeated) which contains two data elements: marital status, and date of marriage.

ii) Address subgroup (this group may be repeated) which contains three data elements: address, housing status, and date of housing status.

iii) Body characteristics subgroup (this group will occur only once) which contains eleven data elements: weight, height, blood type,

hair, colour of skin, colour of eyes, size of shoes, size of hat, size of pants, size of shirt, and size of chest.

- iv) Category and status subgroup (this group will occur only once) which contains seven data elements: original personal status, date of original personal status, current personal status, date of current personal status, personal category, date of personal category, and active duty obligation time (active duty service began).

2. Data elements that are dynamic, frequently changed, and which most require replication for historic purposes. These data can be subdivided into several groups according to their corresponding historical data applications. These groups include:

- a) Rank group (this group is repeated) which contains seven data elements: rank, rank status, date of rank, number of decision letter, date of decision letter, who gave the decision letter, and type of promotion.
- b) Profession group (this group is repeated) which will contains ten data elements: name of profession, number of decision letter, date of profession, number of professional warrant, date of warrant, group (echelon) of profession, station, reporting date at station, status of placement, and date of placement.
- c) Education group (this group is repeated) which contains nine data elements: group code of education, educational institution's name, start date, completion date, station, town, result of education, class standing, and class size.



In addition this group contains the repeated subgroups; i.e. Subjects (which contains two data elements: subject name, and grade).

d) Family group (this group is repeated) which contains seven data elements of each family and members: family name, family relation, sex, date of birth, place of birth, religion, and address. In addition there two repeating occurrence subgroups data elements for each family and members:

i) Activity & Profession subgroup (this group is repeated) which contains four data elements: name of activity, place of activity, start date, and completion date.

ii) Education subgroup (this group is repeated) which contains three data elements: educational institution's name, group code of education, and result of education.

e) Payroll group: this group need not be broken-down further since it is usually only for the monthly payroll application, which contains fourteen data elements: date of beginning payroll, rank in payroll, payroll period (month), number of children authorized family allowance, status of children authorized family allowance, main salary, wife's family allowance, children's family allowance, other family allowances, obligated reductions, rice reductions, other reductions, total salary, and unit of payroll.

f) Security group (this group is repeated) which contains six data elements: violation/infringe type, what, where, when, why, and how. In addition there are two subgroups for each Violation/Infringe type:

- i) Who Involved subgroup (this group is repeated) which contains three data elements: name involved, personal identification, and profession.
- ii) Measures subgroup (this group might be repeated) which contains three data elements: action type, start date, and completion date.

Data elements which will become the key to each group can be found in the next chapter (Data Base Model Design).

### III. DATA BASE MODEL DESIGN

#### A. GENERAL

Considering the foregoing synopsis of user requirements and the DBMS\* (Data Base Management System), a number of important questions are raised. Among these are:

1. What are appropriate data structures with which to implement the physical Data Base ?
2. What are the properties of a useful data model, and how should they be represented in the physical structures.

In this chapter the author will examine the problem of what the Data Base should look like to the user; i.e., what would be the appropriate data model to implement the real world.

A model is a basic system of constructs used in describing reality. It reflects a person's deepest assumptions regarding the elementary essence of things. It may be called a world view. It provides the building blocks, the vocabulary that pervades all of a person's descriptions. A model is more than a passive medium for recording our view of reality. It shapes that view, and limits our perceptions.

The organization of the data is represented by a data model. A data model is an intellectual tool used to understand the logical organization of data. To understand data models fully, it is necessary to be aware of how people perceive data. Data can be discerned at several levels. At one

---

\*DBMS is the software which handles all access to the Data Base.

level, people logically organize their perceptions of the real world. At another level, they interpret (give meaning to) the real world. Finally, they use data models to describe and record the interpretation of the world as data in their computers or perhaps in some other physical medium.

A data model must be rich enough in structure to describe the significant aspects of the real world, yet it must be possible to determine fairly automatically an efficient implementation of the conceptual scheme by a physical scheme. The conceptual scheme is an abstraction of the real world pertinent to an enterprise.

D. C. Tsichritzis and F. H. Lochovsky [Ref. 18] define a data model as

a pattern according to which data are logically organized. It consists of named logical units of data and expresses the relationships among the data as determined by the interpretation of a model of the world.

One of several data models can be used to represent the interpretation of a model of the world. The main difference between them is the manner in which they represent certain relationships among the data.

Data values, by themselves, say nothing meaningful. Some information will be available if a relationship has been established between the values.

A relationship is an association among several things, with that association having a particular significance. Relationship might be one-to-one, one-to-many, or many-to-many.

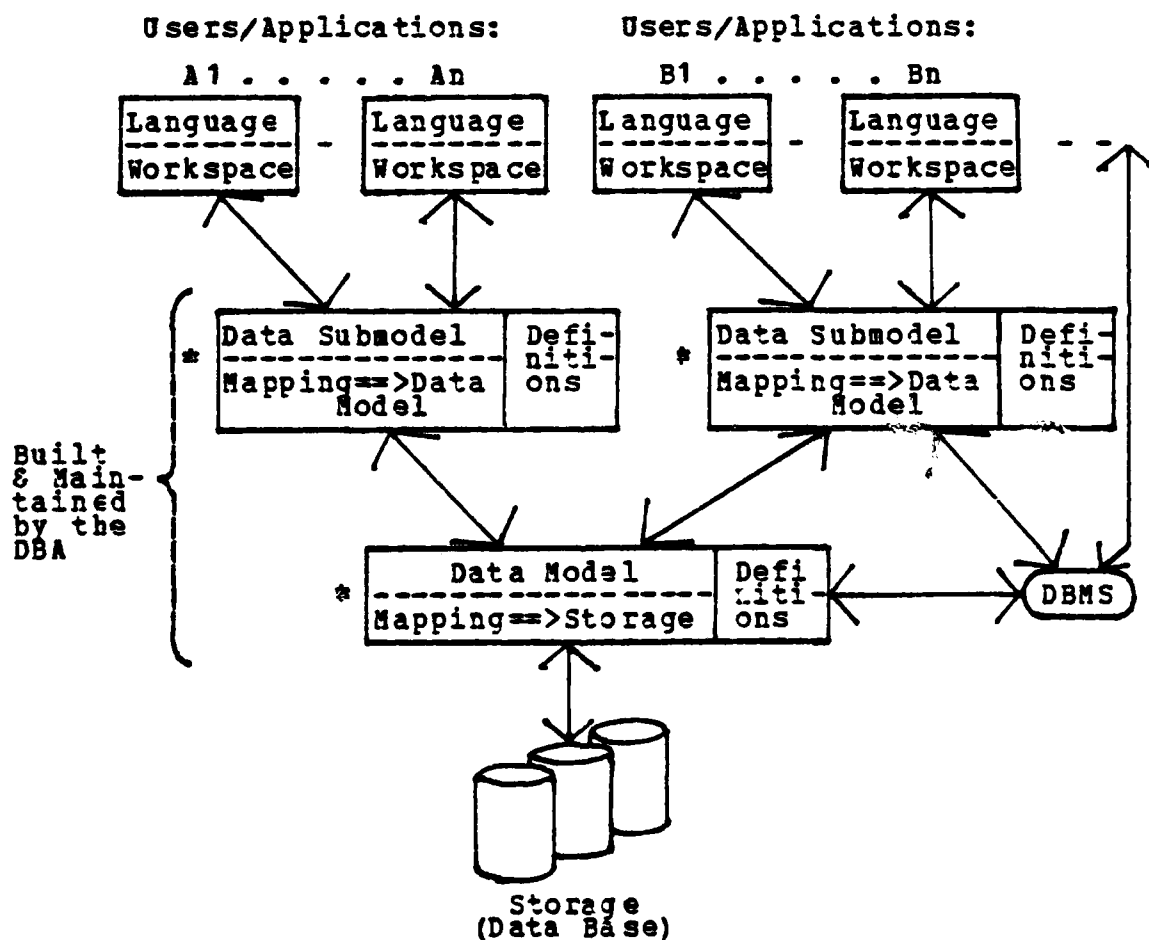
There are 3 major data models that have been used in Data Base systems:

1. Relational: this model is based on the set theoretic notion of a relation, that is, a set of k-tuples for some fixed k.

2. Hierarchical: this data model is a tree, where nodes might represent data elements groups.

3. Network: this is the directed graph model, where nodes represent sets of similar entities and arcs represent associations.

To see the roll or place of the data model in the Data Base System as viewed by users, can be seen in Diagram 1 as a general architecture for a Data Base System extracted from C. J. Date's book [Ref. 3].



Note: \* User/Programmer interface

Diagram 1. A General Architecture for a Data Base System

The Data Base is the data as physically recorded (the storage structure). In between the Data Base and the users is interposed the data model, which is the information content of the Data Base as it is viewed by the users; that is, to the users the data model is the Data Base. The data model definitions define the various types of data model records.<sup>5</sup>

In practice most users will be interested only in a small portion of the total data model. The facility is therefore provided of extracting a data submodel from the complete data model by means of a data submodel description. A data submodel may be considered as the restriction of the total data model, to just that portion of interest to a particular group of users (the community user view). It consists of multiple occurrences of multiple types of data submodel record.

Different terms are used to describe analogous concepts in different Data Base architectures. Table 1 lists terms used in those different models (the general model described in Diagram 1, the Data Base Task Group model (DBTG), and the Information Management System model (IMS)) and their correlation. That is, the concepts of data model and data submodel correspond respectively to schema and subschema<sup>6</sup> in DBTG, and Data Base Description (DBD) and the set of all Program Communication Block (PCB) plus the associated mapping definition called Program Specification Block (PSB)<sup>7</sup> in IMS.

-----  
<sup>5</sup>A record is a named collection of zero, one, or more data elements or data aggregates.

<sup>6</sup>Schema is the complete description of all the elements in a Data Base. It includes the names and descriptions of all data elements, data aggregates, record occurrences, and areas that are part of the Data Base. While Subschema is a consistent and logical subset of the schema from which it was obtained [Ref. 7 and 6].

<sup>7</sup>Each physical Data Base is defined by a DBD, the mapping of physical Data Base to storage is also specified (at least in part) in the DBD. Each logical Data Base is

**Table 1. Comparison of terms in various  
Data Base Architectures**

----- Architecture -----		
General	DBTG	IMS
-----		
Data Model	Schema	set of all DBD (Data Base Description)
Data Submodel	Subschema	set of all PCB (Program Communication Block) plus the associated mapping definition called PSB (Program Specification Block)
Workspace	UWA (User Work Area)	I/O (Input/Output) area
Language	Host Language + DML (Data Manipulation Language)	Host Language + DL/I (Data Language/I)
DBMS	DBMS	IMS Control Program
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## B. APPLICATIONS TO DATA ELEMENTS GROUPS MAPPING ANALYSIS

The decision to implement a Data Base is motivated by the need to share data among a variety of diverse applications and to integrate data for supporting more sophisticated applications. Both of these requirements complicate the already difficult task of providing safe and efficient access to computerized data. DBMS's have evolved to answer two critical needs: support for more interrelated data and support for sharing data among many diverse applications. These goals are being achieved, in part, by providing DBMS software to physically link related data into complex

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defined, together with its mapping to the corresponding physical Data Base, by means of PCB. Each user has its own PSB (that is, PSBs may not be shared, though two distinct PSBs may actually contain the same information). [Ref. 3]

structures using such mechanisms as pointer chains, indices, and sequential positioning. They are also being achieved by the development of Data Base design methodologies and rules such as the practice of storing information in a non-redundant fashion so that changes by one application to the single copy of the data are seen by all its users. In other words, that it is expected that the updates of each user will be apparent to the other users of the data because a major goal of Data Base Management is data sharing.

Table 2 shows the mapping of applications to the data elements groups from the previous chapter (User Requirements Definitions and Analysis) as the external views\* which serves as a basis for designing a data model.

In the table, the following abbreviations are used: MAINID for Main Identification, PERSCHAR for Personal Characteristics, MARR for Marriage, ADDR for Address, BODYCHAR for Body Characteristics, CATEG for Category and Status, RANK for Rank, PROFF for Profession, EDUC for Education, SUBJ for Subjects, FAM for Family, FACT for Families's Activity, FEDUC for Families's Education, PAYROLL for Payroll, SEC for Security, WHO for Who involve, and MEAS for Measures.

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\*The external view is information as presented on output reports, displays, etc., and its correspondence to data on input sources. It is this correspondence between the data and the information derived upon which the user's external view is based. [Ref. 14]



**Table 2. Applications to Data Elements Groups Mapping**

No. Applications	Data Elements Groups					
	MAINID		PERSCHAR			
			MARR	ADDR	BODYCHAR	CATEG
1. Personal identification and the combination of all applications	:	X	X	X	X	X
2. Personal Characteristic	:	X	X	X	X	X
3. Rank promotion and regular reports	:	X				X
4. Profession	:	X				
5. Education	:	X				
6. Family	:	X				
7. Payroll	:	X	X			X
8. Security	:	X	X	X	X	X

No. Applications	Data Elements Groups			
	RANK		PROFF	EDUC + SUBJ
1. Personal identification and the combination of all applications	:	X	X	X
2. Personal Characteristic	:			
3. Rank promotion and regular reports	:	X	X	X
4. Profession	:	X	X	X
5. Education	:	X	X	X
6. Family	:			
7. Payroll	:	X	X	
8. Security	:	X	X	X

Table 2. (continued)

No. Applications	Data Elements Groups		
	FAM + (FACT & PEDUC)	PAYROLL	SEC (WHO & MEAS)
1. Personal identification and the combination of all applications :	X	X	X
2. Personal Characteristic :			
3. Rank promotion and regular reports :			X
4. Profession :			X
5. Education :			X
6. Family :	X		
7. Payroll :		X	
8. Security :	X	X	X

Considering the external view and special processing requirements, now the author can determine the required local view\* for each application function, as depicted in Diagram 2. Note: circled numbers 1 through 8 represent the application numbers depicted in Table 2. The relation attribute shown in Diagram 2 is named "need."

\*The local view represents that portion of the Data Base required to support a particular application function to generate the external view or, in the case of update, to absorb the external view. The collection of local views for the various applications functions using the Data Base determines the requirements of the external view. [Ref. 14]

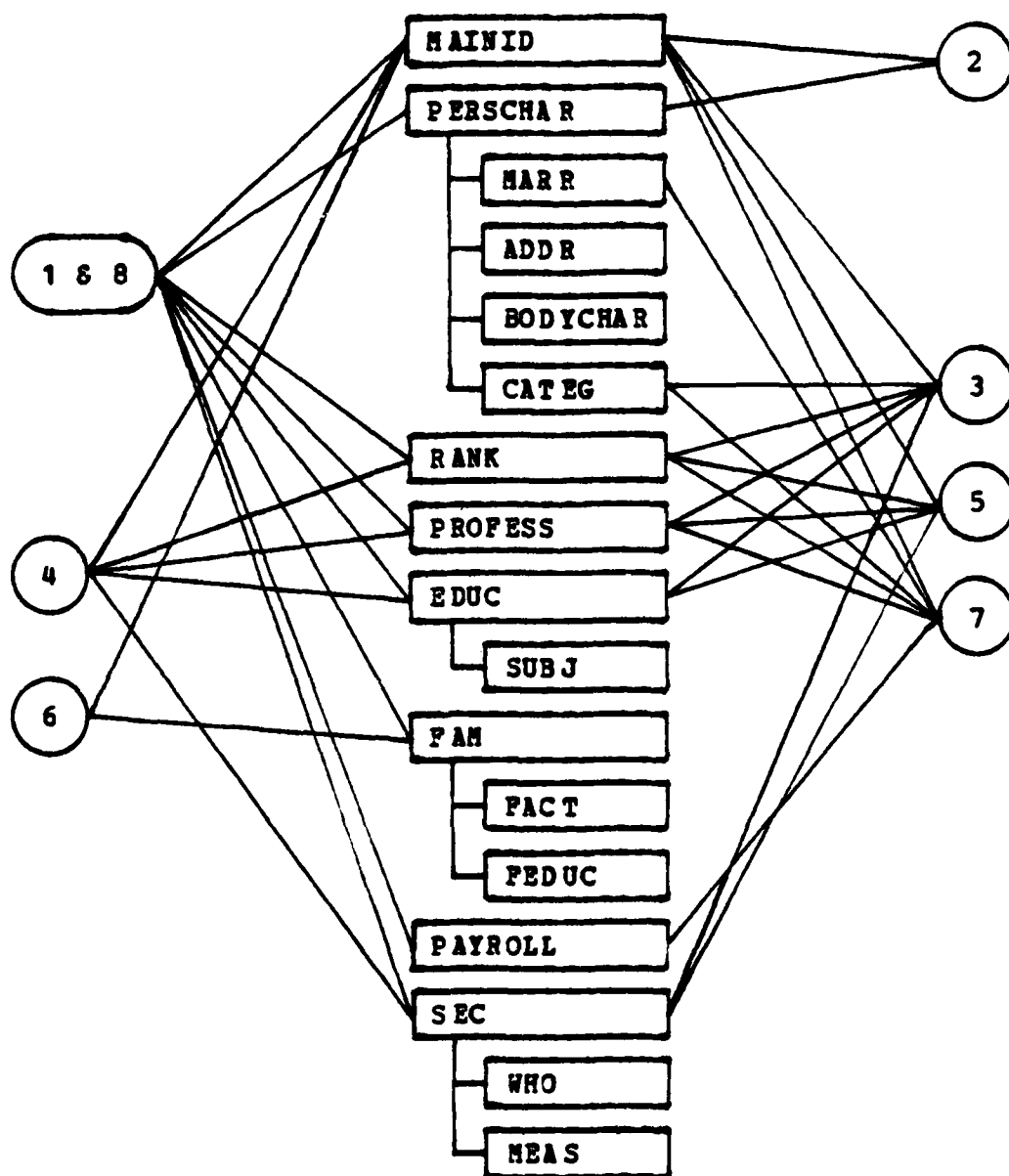


Diagram 2. Local view for each application

### C. DATA MODEL DESIGN

Now is the time to derive the required content and structure of the internal view<sup>10</sup> which is the end result of the data model design. The primary tool in Data Base design is a good data model design which satisfies the organization's requirements and specifies the conceptual design.

Some characterization of a "good" conceptual design as extracted from Diane C. P. and J. M. Smith paper [Ref. 16] are as follows:

- Concept complete: derivable concepts should be included.

This concept guarantees that no useful objects are left out of the Data Base and that designers are not inappropriately constrained. For many derived concepts the derivation can only be made in one direction, but when the derivation is reversible there may be a performance reason for choosing one object to be the base and the other to be derived.

- Evolvable: it should be locally modifiable and it should be flexible in supporting user interpretations.

Locally modifiable in each iterations produced by the design process will make the process becomes easy and time saving. Flexibility of interpretation is another property that facilitates the design process in that new applications may be added with potentially little impact on the existing design.

- Independence of existing installation and DBMS constraints.

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<sup>10</sup>The internal view is the complete data structure maintained by the system to generate the multiple local views. The internal view describes the Data Base itself. [Ref. 14]

Develop the design independent of current state limitations and conventions first and then tailor it to the system. When changes occur the original design will be available to facilitate system update or conversion.

From the local view as depicted in Diagram 2, the author can derive the relationship between the data element groups as to the owner and the member<sup>11</sup> as depicted in Table 3. The relationship "is-part-of" is the attribute name of the relationship from the member to the owner, or attribute name "has-<sup>12</sup>" from the owner to the member.

Regarding the data model, further Diane C. P. and J. M. Smith [Ref. 16] define each of the following properties contribute to the value of a "good" data model:

- It should be expressive.

A data model should be sensitive to important distinctions, so it will guide its users to include the concepts and objects necessary to a good design.

- It should not over-constrain implementors.

The data model should not imply a particular implementation strategies and its vocabulary should be at a high enough level to be free of implementation connotations.

- A data model should have a formal basis.

This provides the physical designers and implementors with a sound foundation for verifying their work and eliminates the ambiguity.

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<sup>11</sup>The owner is the same as master, superior or parent group which has zero or more member (subordinate or dependent) group of data elements.

<sup>12</sup>Where "-personal characteristic," "-rank," "-profession," etc. are substituted for "-".

**Table 3. Data elements groups (as owner-member)  
relationship**

Owner	Member										
	MAINID	PERSCHAR				RANK	PROFF	EDUC	PAN	PAYROLL	SEC
		a	b	c	d						
MAINID			X			X	X	X	X	X	X
PERSCHAR											
			X	X	X	X					
RANK											
PROFF											
EDUC											
PAN											
PAYROLL											
SEC											

Ncte: a = MARR, b = ADDR, c = BODYCHAR, d = CATEG, e = SUBJ,  
f = FACT, g = PEDUC, h = WHO, i = MEAS.

- A data model should be widely applicable.

To produce an integrated design that can be checked for internal consistency, we have to use one data model which encompass applications that are very dynamic, very scientific, and very commercial in their orientation.

- A data model should be understandable.

A data Model should provide some kind of non-technical presentation, pictorial, and utilising the terminology and linguistic constructs of the end user.

- Finally and most fundamentally, a data model must reflect and support human concept formation and understanding.

The composition rules (syntax) of the data model do not force its users to assemble objects in ways that differ from how they would naturally assemble them, because humans have innate mechanisms for coping with complexity.

The utility of a data model depends not just on the properties described above, but also on the existence of a set of rules or a methodology for using it. Without such guidance many designs may be produced even using a good data model before an acceptable one is achieved.

The method for modelling the individual structured components pertinent to an enterprise and their interrelationships is based on mechanisms that human use for thinking about such things. It is the premise of this data model that we as human beings succeed in understanding complex systems by creating abstractions from that can be named and conceived of as a whole. Thus, an abstraction of a system is a collection of details that can be treated as a whole.

Finally from all of the above analysis author can derive a data model as depicted in Diagram 3.

The data elements which are in the groups can be seen in chapter 2 section D (Data Elements and Their Groupings).

The key of each group is: personal serial number for Main Identification group (this also as the main key for

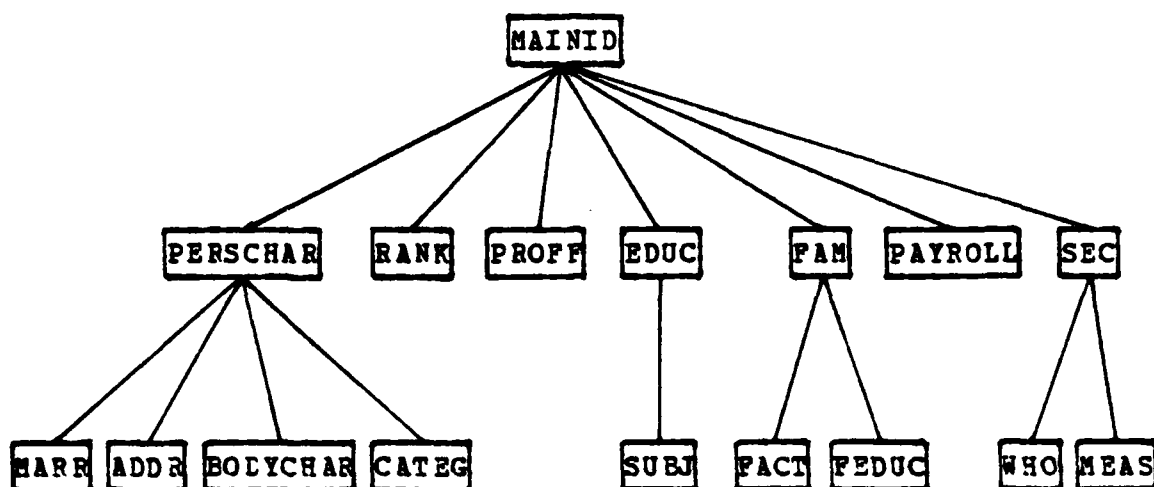


Diagram 3. Personnel Data Model

each person), marital status for Marriage subgroup, housing status for Address subgroup, blood type for Body Characteristic subgroup, current personal status for Category and Status subgroup, rank for Rank group, echelon of profession for Profession group, group code of education for Education group, subject for Subjects subgroup, family relation for family group, name of activity for Activity subgroup, family group code of education for Family Education subgroup, unit of payroll for the Payroll group, violation/infringe type for Security group, name involved for Who involved subgroup, and action type for Measures subgroup.

For the complete description see the Data Base dictionary in Appendix B.



## D. SPECIAL DISCUSSIONS

### 1. Personal Serial Number

The personal serial number is the main key in the Personnel Data Base. Many significant differences exist between military and civilian serial numbers. Even within the military there are a large number of major differences. In order to make accessing the Data Base easier, the personal serial number must be transformed into a common form before they are actually stored in the Data Base. Thus, a routine must be designed to transform the various forms of personal serial numbers into a common form before storing them in the Data Base and then transform them back to their original form upon retrieval.

Below are the recommended transformations for personal serial numbers:

#### a. Military:

##### 1). Officer:

a). Regular: 00NNNNNNN

Example: 8999/P =====> 000008999

b). Titular: 10NNNNNNN

Example: 7188/P T =====> 100007188

c). Military obligated: 20YYNNNNN

Example: 7919786/W =====> 207919786

##### 2). Warrant Officer and below:

a). Regular: 30NNNNNNN

Example: 93246 =====> 300093246

b). Military obliged: 40YYNNNNN

Example: 8025134 =====> 408025134

b. Civilian: 5NNNNNNNN

Example: 30599791 =====> 530599791

## 2. Security Group

This group is provided as an additional one because of its importance to users. There is no data available for it at the present in Dispullahtal, but it is maintained in the Intelligence-Security Office.

This group can only be accessed by authorized Intelligence-Security Personnel, and thus it must be given special treatment. Only those who are privileged to use it can access these groups/segments. Thus, data security<sup>13</sup> is required for this group. The issue of security enforcement involves two things: (1) authorization procedures which not only help in user identification but allow users to determine their own passwords, and (2) control by the system of user actions after authorization is given. Security controls range from simple sign-on procedures that access to the whole system, through passwords that control access to different levels of the Data Base, to elaborate access matrices and programmed procedures. Furthermore, cooperation between the Intelligence-Security officer and the DBA is a must in controlling and maintaining the security data element group.

## 3. Data Dictionary/Directories (DD/D)

Individual DBMS' have their own methods to predefine data descriptions. Each has a repository for the Data Base

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<sup>13</sup>Data security is protection of the data against unauthorized disclosure, alteration, or destruction. [Ref. 17]

description, a language facility to process that description, and a mechanism to input that description to the DBMS.

The general objectives of a DD/D [Ref. 19] are to:

- Prevent unplanned redundancy and inconsistency in application systems development in the areas of source-data collection, processing, secondary storage, and information to users.
- Reduce application systems development and implementation lead times and costs.
- Reduce applications modification lead times and costs.
- Allow for establishment and enforcement of standards relating to data usage and responsibility (format, meaning, validity, timeliness, and so forth).

In most DBMS's the included data dictionary is primarily oriented toward the internal representation or the machine use of the data definition. It defines the internal form, physical location, and access to the stored data. Clay R. Sprowls [Ref. 17] says that the data dictionary is primarily

a directory that defines the internally necessary attributes of the data, their physical characteristics, and stored locations.

The Data Base description does contain some dictionary information oriented toward the user. But it does not provide all of the information that a good dictionary should provide for the variety of users who need access to data descriptions. Clay R. Sprowls [Ref. 17] lists some suggested contents of data dictionary as follows

- Usage: status (tentative or approved), effective data, programs (used by), and users (both formal and informal).

- Relationships: field (group, record, file, set, network), linkage (pointers to and from), parent of, child of, sorted order by key, and relative position in data description.
- Administrative control: ownership (department, department position), definition (proposed by, analyst name), authority to access data (to define, to add or delete, to change), security (special provisions), source (input, document description, generated, and algorithm to compute).
- Identification: label, programming language name, synonyms (if same data field is used more than once), textual descriptions (including perhaps keyword descriptions), version number (for validation changes), last change date (for keeping data definitions current).
- Technical specifications: data type (quantitative or qualitative), use (external and internal), form of each use (length, representation or picture, precision, mode, justification, report form edited), unit of measure, time dependency (for update), accessing (record key or index), data validation, edit masks (valid codes), value range, and test data (for program listing).

An exact list of dictionary contents for an organization and its DBMS depends upon the breadth and emphasis it places on the use of the dictionary. The data dictionary for the Personnel Data Base and its description are depicted in Appendix B.

#### 4. Journalizing

A Data Base Management System must provide a means to restore the Data Base to a consistent state that reflects

the situation after some number of transactions were completed. The journal is a basic accounting record in which all transactions of a certain type are recorded. A system journal records every transaction that occurs within the system. Jeffrey D. Ullman [Ref. 20] lists the most general case of journal entries which consists of (1) a unique identifier for any transaction causing a change, (2) the old value of the item, and (3) the new value of the item.

In this Data Base the author suggests that journal entries consist of:

- Identification of the users accessing the Data Base.
- Type of operation accessing the Data Base (update, insert, delete, list, etc.).
- Pointer to the record being accessed.
- Personal serial number of the record being accessed.
- The old value of the item.
- The new value of the item.
- Time and date of the beginning and of the end of transactions and accesses.
- Summaries which contain the number of personnel in the Navy either military or civilian, number of personnel in each rank.

## 5. Administration

The Data Base administration is the agency which exercises centralized control over the Data Base System. It includes several specialties, including information system analysis, data structure and data storage organization design, security, recovery, auditing, and accounting. Each

of these specialties may be assigned to one individual for an uncomplicated Data Base used under undemanding conditions.

The individual in charge of the Data Base administration is the Data Base Administrator (DBA). The DBA uses the computer to build and operate his tools. Such tools may include system flow analysis tools, data relationship analysis tools, performance simulators, data storage organization and reorganization tools, and other utilities. Beside the DBA the personnel with the specialties mentioned above must be organized to manage and improve the Data Base.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

This thesis project explored the step-by-step logical design of the Personnel Data Base model which covers:

1. Gathering, recording, and analyzing the user requirements, including the analysis of the applications function and determining data element groupings. This Data Base consists of 97 (ninety seven) data elements which have been divided into 17 (seventeen) data element groups.
2. Deriving and designing a logical data model, including the analysis of data element groups relationships, applications to data element groups relationships, and determining the Personnel Data Base model. The structure of the data model designed is hierarchical. The Data Base dictionary was also designed as a directory for the Data Base and is included in Appendix B.

The Data Base design effort is not completed, and can not be, until the logical design is finished. After this has been done the logical design must be transformed to a physical design. The author's recommendations are:

1. To continue and to complete the design. This involves applying this data model to a physical machine.
2. To form and organize a Data Base administration, identifying the personnel needed to manage and improve the Data Base.

## APPENDIX A

### LIST OF DATA ELEMENTS FROM FILE SYSTEM

1. Personal Serial Number
2. Check Digit of the Personal Serial Number
3. Duplication Code of the Personal Serial Number
4. Batch Number
5. Name's Spelling Code (Old or New)
6. Name
7. Original based name from
8. Corps
9. Named based originally from
10. Current Personal Status
11. Date of Current Personal Status
12. Personal Category
13. Date of Personal Category
14. Date of Birth
15. Current Station
16. Current Rank
17. Active Duty Obligation Time (Active Duty Service Began)
18. Sex
19. Marital Status
20. Number of Wives
21. Number of Children
22. Number of Children Authorized Family Allowance
23. Status of Children Authorized Family Allowance
24. Status of House
25. Blood Type
26. Weight



27. Height
28. Color of Skin
29. Hair
30. Color of Eyes
31. Size of Shoes
32. Size of Hat
33. Size of Pants
34. Size of Shirt
35. Size of Chest
36. Unit of Administration
37. Unit of Payroll
38. Unit of Individual's Field Provisions (Equipment)
39. Unit of Side Dishes Money
40. Religion
41. Tribe
42. Place of Birth
43. Rank
44. Status of Rank
45. Date of Rank
46. Decision Letter of Rank
47. Date of Decision Letter of Rank
48. Who Gave the Decision Letter
49. Type of Promotion
50. Date of Profession
51. Status of Placement
52. Date of Placement
53. Station
54. Reporting Date
55. Profession's Name
56. Rank in Profession
57. Decision Letter of Profession
58. Date of Profession's Decision Letter
59. Warrant of Profession
60. Date of Warrant of Profession

61. Echelon (Group) of Profession
62. Group Code of Education
63. Start Date of Education
64. Completion Date of Education
65. Place of Education (Station, Town)
66. Educational Institute's Name
67. Result of the Education
68. Class Standing
69. Class Size
70. Relative's Identity
71. Relative's Name
72. Relative's Relation
73. Relative's Birth Date
74. Relative's Sex
75. Relative's Birth Place
76. Relative's Religion
77. Code of the Relative's Description
78. Relative's Description
79. Date of Payroll
80. Rank in Payroll
81. Status of Payroll Period
82. Payroll Period
83. Marital Status in Payroll
84. Main Salary
85. Wife's Family Allowance
86. Other Family Allowance
87. Children Family Allowance
88. Extra Earnings
89. Main Reduction of Salary
90. Rice Reductions
91. Advance Payment Reductions
92. Housing Reductions
93. Loss-damage Reductions
94. Other Reductions

- 95. Reduction's Code
- 96. Completion Date for the Reduction of the Advance  
Payment
- 97. Completion Date for the Reduction of Loss-damage
- 98. Completion Date for Other's Reduction
- 99. Salary Round-off
- 100. Unit of Payroll

## APPENDIX B

### DATA BASE DICTIONARY

This data dictionary contains descriptions of the Personnel Data Base segments (data elements groups) and their data elements. There are six columns in the table:

1. **Element Number (ELN #).** The data element/segment number contains four digits. The first two digits is the segment number, beginning from the root and increasing by one (leading zeroes suppressed), and another two digits for the data element number in the segment beginning from one and increasing by one. For example: 1005 indicates the tenth segment and data element number five in the segment.
2. **Data Element (DATA-ELEMENT).** This column contains data element/segment name as it is known to the users.
3. **Data Name (DATA-NAME).** This column contains the unique name for data element/segment which is to be used by programmer/user when retrieving data from the Data Base.
4. **Type (TYPE).** This column contains the data element's type where N means Numeric and AN means Alpha Numeric.
5. **Number of Character (# OF CHAR).** This column contains number of characters in the record field of the data element/segment.

6. Description (DESCRIPTION) . This column contains the description of the data element/segment. Described are the data element/segment relationships (dependent, root, etc.), key record/segment, administrative control, usage, and identifications. This description helps the programmer/user to find the path to desired data element/segment in the Data Base.

The abbreviations used in the data dictionary table are: DB for Data Base, segm for segment, lev for level, tbl for table and refer to the Personal Tables (numbered in parenthesis) in APPENDIX C. YYMMDD for Year (two digits) Month (two digits) and Date (two digits), occur for occurrence, dependt for dependent, Kg for Kilogram, and Cm for Centimeter.

ELM #	DATA- ELEMENT	DATA- NAME	TY- PE	# OF CHAR	DESCRIPTION
100	Main identification	MAINID		76	Root segm DB lev 1, segm 1, one occur
101	Personal Serial Number	SERNUM	N	9	Record key (Main key)
102	Name	NAME	AN	26	Name, title
103	Corps	CORPS	N	3	See corps tbl (19)
104	Sex	SEX	N	1	See sex tbl (3)
105	Birth date	DMBIRTH	N	6	YYMMDD
106	Birth place	PMBIRTH	AN	15	Town (city)
107	Religion	RELIGION	N	1	See religion tbl (12)
108	Tribe	TRIBE	AN	15	-

200 Personal characteristics	CHARACT			Dependt segm of root, lev 1, segm 2, one occur
300 Marriage	MARR		7	Dependt segm of CHARACT, lev 3, segm 3, repeated
301 Marital status	MARST	N	1	See marital status tbl (4), segm key
302 Date of status	MARDT	N	6	YYMMDD
400 Address	ADDR		33	Dependt segm of CHARACT, lev 3, segm 4, repeated
401 Address	ADDRESS	AN	26	-
402 Housing status	HOUSE	N	1	See housing status tbl (6), segm key
403 Date of status	HOUSEDT	N	6	YYMMDD
500 Body characteristic	BODYCHAR		18	Dependt segm of CHARACT, lev 3, segm 5, one occur
501 Weight	WEIGHT	N	3	In Kg
502 Height	HEIGHT	N	3	In Cm

503 Blood type	BLOOD	N	1	See blood type tbl (7), segm key
504 Color of skin	SKIN	N	1	See color of skin tbl (8)
505 Hair	HAIR	N	1	See hair tbl (9)
506 Color of eyes	EYES	N	1	See color of eyes tbl (10)
507 Size of shoes	SHOES	N	2	-
508 Size of hat	HAT	N	2	-
509 Size of pants	PANTS	N	1	See pant shirt tbl (11)
510 Size of shirt	SHIRT	N	1	See pant shirt tbl (11)
511 Size of chest	CHEST	N	2	-

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600 Category and status	CATEG		29	Dependt segm of CHARACT, lev 3, segm 6, one occurr
601 Original personal status	ORPERST	N	2	See personal status tbl (1)
602 Date of original personal status	ORPERDT	N	6	Y1MMDD
603 Current personal status	CRPERST	N	2	See personal status tbl (1), segm key
604 Date of current personal status	CRPERDT	N	6	Y1MMDD
605 Personal category	CATEGORY	N	1	See personal category tbl (2)

606	Date of personal category	DTGORY	N	6	YYMMDD
607	Active duty obligated time (Active service duty began)	DTACT	N	6	YYMMDD
<hr/>					
700	Rank	RANK		39	Dependt segm of root, lev 2, segm 3, repeated
701	Rank/Group	RANKG	N	2	See rank tbl (18), segm key
702	Status of rank	STRANK	N	1	See status of rank tbl (13)
703	Date of rank	DTRANK	N	6	YYMMDD
704	Number of decision letter	NBDECLET	AN	8	Format:NNNNMMYY NNNN: number MM : month YY : year
705	Date of decision letter	DTDECLET	N	6	YYMMDD
706	Who gave the decision letter	GVDECLET	AN	15	Official functionary
707	Type of promotion	TPPROM	N	1	See type of promotion tbl (14)
<hr/>					
800	Profession	PROFESS		71	Dependt segm of root, lev 2, segm 4, repeated
801	Name of profession	NMPROP	AN	15	-



802	Number of decision letter	NBDECP	AN	8	Format:NNNNMMYY NNNN:Number MM:Month YY:Year
803	Date of decision letter	DTPROP	N	5	NNNNNN-YYMMDD
804	Number of professional warrant	NBWARP	AN	8	Format:NNNNMMYY NNNN:Number MM:Month YY:Year
805	Date of warrant	DTWARP	N	6	NNNNNN-YYMMDD
806	Echelon of profession	ECHELON	N	2	See echelon tbl (21)
807	Station	STATION	N	3	See station tbl (22)
808	Reporting date	DTSTAT	N	6	YYMMDD
809	Status of placement	STPLACE	N	1	See status of placement tbl (15)
810	Date of placement	DTPLACE	N	6	YYMMDD

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900	Education	EDUC		73	Dependt segm of root, lev 2, segm 9, repeated
901	Group code of education	EDUCCD	N	3	See group code of education tbl (20) , segm key
902	Educational Institute's Name	EDUCNM	AN	15	-
903	Start date	EDUCSD	N	6	YYMMDD
904	Completion date	EDUCCM	N	6	YYMMDD

905 Station	EDSTAT	N	3	See station tbl (22)
906 Town (city)	EDTOWN	AN	15	-
907 Result of education	RESULT	N	1	See result of education tbl (16)
908 Class standing	CSTAND	N	3	-
909 Class size	CSIZE	N	3	-
<hr/>				
1000 Subjects	SUBJ		18	Dependt segm of EDUC, lev 3, segm 10, repeated
1001 Subject name	SUBJECT	AN	15	Segm key
1002 Grade	GRADE	AN	3	Can be numeric or alphabet
<hr/>				
1100 Family	FAM		76	Dependt segm of root, lev 2, segm 6, repeated
1101 Family name	FNAME	AN	26	Name, title
1102 Family relation	FREL	N	1	See family relation tbl (17), segm key
1103 Sex	FSEX	N	1	See sex tbl (3)
1104 Birth date	FDBIRTH	N	6	YYMMDD
1105 Birth place	FPBIRTH	AN	15	Town (city)
1106 Religion	FRELIGI	N	1	See religion tbl (12)
1107 Address	FADDR	AN	26	-

1200 Activity	FACT		48	Dependt segm of FAM, lev 3, segm 12, repeated
---------------	------	--	----	--

1201 Name of activity	FNACT	AN	26	Segm key
1202 Place of activity	FPACT	AN	15	Town (city)
1203 Start date	FSACT	N	6	YYMMDD
1204 Completion date	FCACT	N	6	YYMMDD

---

1300 Family education	FEDUC		16	Dependt segm of FAM, lev 3, segm 13, repeated
-----------------------	-------	--	----	--

1301 Educational Insti- tute's Name	FEDNACT	AN	15	-
--	---------	----	----	---

1302 Group code of education	PCDACT	N	3	See group code of education tbl (20), segm key
---------------------------------	--------	---	---	---

1303 Result of education	FEDRES	N	1	See result of education tbl (16)
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1400 Payroll	PAYROLL		59	Dependt segm of root, lev 2, segm 14, one occurr
--------------	---------	--	----	---

1401 Date of beginning payroll	DBPAY	N	6	YYMMDD
-----------------------------------	-------	---	---	--------

1402 Rank in payroll	RKPAY	N	2	See rank tbl (18)
----------------------	-------	---	---	----------------------

1403 Payroll period	PERPAY	N	3	In month
---------------------	--------	---	---	----------

1404	Number of children authorized family allowance	CHPAM	N	1	-
1405	Status of children authorized family allowance	STCHPAM	N	1	See children allowance sta- tus tbl (5)
1406	Main salary	MAINSAL	N	6	In Rupiah
1407	Wife's Family Allowance	WFALL	N	5	In Rupiah
1408	Children Family Allowance	CHALL	N	5	In Pupiah
1409	Other family allo- Allowances	OTALL	N	5	In Rupiah
1410	Obligated reductions	OBRED	N	5	In Rupiah
1411	Rice reductions	RCRED	N	5	In Rupiah
1412	Other reductions	OTRED	N	5	In Rupiah
1413	Total salary	TOTSAL	N	6	In Rupiah
1414	Unit of payroll	UNPAY	N	4	See station tbl (22), sega key

---

1500	Security	SEC		35	Dependt sega of root, lev 2, sega 15, repeated
1501	Violation / Infringe type	VTTYPE	N	1	See violation / infringe type tbl (23), sega key
1502	What	WHAT	N	3	See what tbl (24)
1503	Where	WHERE	AN	15	Town (city)
1504	When	WHEN	N	6	YYMMDD

1505 Why	WHY	N	5	This reason description is stored in other file with key number here (N 5)
1506 How	HOW	N	5	Same as 1505
-----				
1600 Who involved	WHOINV		50	Dependt segm of SEC, lev 3, segm 16, repeated
1601 Name involved	INVNAME	AN	26	Segm key
1602 Personal identification	PERSID	AN	9	Personal Serial number or other valid identification
1603 Profession	PROFINV	AN	15	-
-----				
1700 Measures	MEAS		27	Dependt segm of SEC, lev 3, segm 17, repeated
1701 Type of action	NMEAS	AN	15	Segm key
1702 Start date	SMEAS	N	6	YYMMDD
1703 Completion date	CMEAS	N	6	YYMMDD

=====

## APPENDIX C

### DATA BASE PERSONNEL TABLES

Each of these tables contains two elements: code and description. Example: "1 Male" indicates code number 1 is Male.

#### 1. PERSONAL STATUS:

##### A. Military:

01 Volunteer  
02 Obligated

03 Titular

##### B. Civilian:

11 Daily\_labourer  
12 Monthly\_labourer  
13 Monthly\_labourer organic  
14 Temporary Government\_official  
15 Pre\_Government\_official  
16 Civilian\_Government\_official  
17 Civilian\_Military\_Titular Government\_official

#### 2. PERSONAL CATEGORY:

0 Not Clear	5 Waiting for placement
1 Active organic	6 Waiting for direction
2 In charge	7 Pre_retired
3 In assistance	8 Money waiting (UT)
4 In direction	9 Retired

#### 3. SEX:

1 Male	2 Female
--------	----------

**4. MARITAL STATUS:**

1 Married

2 Not married

**5. CHILDREN ALLOWANCE STATUS:**

1 Claimed by him/herself

2 claimed by spouse

**6. HOUSING STATUS:**

## 1 Government-quarters

4 Private/owned

## 2 Mess

**5 Rented**

### 3 Ship

## 6 Contract/Leased

## 7 With relations

**7. BLOOD TYPE:**

1A

3 AB

**2 B**

40

**8. COLOUR OF SKIN:**

1 White

4 yellow-brown

2 yellow

5 BROWN

**3 Black**

**9. HAIR:**

## 1 Straight-lank

### 3 Straight-stiff

2 Curly

#### 4 Heavy

**10. COLOUR OF EYES:**

**1 Black**

3 Brown

**2 Blue**

**4 Green**

**11. SIZE OF PANTS/SHIRTS:**

1 Small

**3 Large**

## 2 Medium

**12. RELIGION:**

**1 Moslem**

4 Hindu

2 Catholic  
3 Protestant

5 Budha  
6 Kong Hu Cu

**13. STATUS OF RANK:**

1 Effective  
2 Temporary  
3 In education

4 Military obliged  
5 Military titular

**14. TYPE OF PROMOTION:**

1 Regular  
2 Extraordinary

3 Honour (meritorious)  
4 Honour-grace (posthumous)

**15. STATUS OF PLACEMENT:**

0 Organic  
1 Labour (non organic)  
2 In charge (detached  
from parent command)

3 In assistance (temporary  
additional duty)  
4 In direction (independent  
duty)

**16. RESULT OF EDUCATION:**

1 Graduated  
2 Not graduated

3 Incomplete

**17. FAMILY RELATION:**

0 Spouse  
1 Child number 1  
2 Child number 2  
3 Child number 3  
4 Child number 4

5 Child number 5  
6 Child number 6  
7 Child number 7  
8 Child number 8  
9 Child number 9

**18. RANK:**

**A. Military:**

99 Third Sailor  
98 Second Sailor  
97 First Sailor  
96 Second Corporal



95 First Corporal  
 88 Second Sergeant  
 87 First Sergeant  
 86 Head Sergeant  
 85 Sergeant Major  
 84 Second Assistant Lieutenant  
 83 First Assistant Lieutenant  
 82 Candidate Officer  
 78 Second Lieutenant  
 77 First Lieutenant  
 76 Captain  
 68 Major  
 67 Lieutenant Colonel  
 66 Colonel  
 58 First Admiral (Commodore) / Brigadier General  
 57 Rear Admiral / Major General  
 56 Vice Admiral / Lieutenant General  
 55 Admiral / General

**E. Civilian:**

48 Group I/A	27 Group III/B
47 Group I/B	26 Group III/C
46 Group I/C	25 Group III/D
45 Group I/D	18 Group IV/A
38 Group II/A	17 Group IV/B
37 Group II/B	16 Group IV/C
36 Group II/C	15 Group IV/D
35 Group II/D	14 Group IV/E
28 Group III/A	

**19. CORPS:**

**A. Military:**

100 Sailor/Deck (for Officer only)  
 161 Deck  
 162 Torpedo

163 Weapon  
164 Constable  
165 Signal  
166 Telegrams  
167 Under-water Weaponry  
  
200 Technician/Engineer (for Officer only)  
261 Machinist  
262 Construction  
263 Ship Construction  
264 Airplane Maintenance  
  
300 Electronics (for Officer only)  
361 Radio  
362 Radio-Radar Mechanic  
363 Electro-Machine Mechanic  
364 Electrician  
365 Sub-weapon Electrician  
366 Electro Mechanic  
367 Weapon Electric Mechanic  
368 Electronica  
  
400 Marine (for Officer only)  
461 Infantry  
462 Amphibious  
463 Field Artillery  
464 Air Defense Artillery  
465 Tank  
466 Pansam (Amphibious Tank)  
467 Transportation  
468 Zipur (Defense Construction)  
469 Communication-Electronica  
470 Nurse  
471 Field Support  
  
500 Administration (for Officer only)  
561 Writer/Typist

562 Finance  
563 Support  
564 Family business  
565 Cook-1  
566 Cook  
567 Tailor  
  
600 Health (for Officer only)  
661 Nurse  
662 Radiologist  
663 Analyst  
664 Dental Technician  
665 Chemist  
666 Assistant Chemist  
  
700 Specialist (for Officer only)  
761 Judicature  
762 Intelligence  
763 Transportation  
764 Carpenter  
765 Physical Fitness  
766 Musician  
767 Photography  
768 Cinematography  
769 Miscellaneous  
  
800 Woman (for Officer only)  
861 Communication  
862 Writer/Typist  
863 Finance  
864 Information  
865 Physical Fitness  
866 Nurse  
867 Nav-Information Defense  
868 Air Traffic Controller  
  
900 Clergy (for Officer only)

**E. Civilian:**

000 Administration  
001 General Administration  
002 Finance Administration  
003 Labour Administration  
004 Support Administration  
005 Nursing Administration  
006 Technic Administration  
007 Typist  
008 Stencil Mechanic  
009 Nursing Staff  
010 Statistic Administration  
011 Law Administration  
012 Library Administration  
013 Transportation Administration  
014 Housing Administration  
015 Post Administration  
016 Miscellaneous Administration  
  
017 Technic  
018 Ship Technician  
019 Engine/machine Technician  
020 Electro Technician  
021 Construction Technician  
022 Carpenter  
023 Welding Technician  
024 Telephone-telegraph Technician  
025 Radio Technician  
026 Mechanic/driver  
027 Labourer  
028 Photographer  
029 Film Operator  
030 Metal Technician  
031 Painter  
032 Weapon Technician

033 Fire Safety Inspector  
034 Constructor  
035 General Controller  
036 Shipyard Worker  
037 Pump Technician  
038 Railroad Technician  
039 Meteorological Technician  
040 Miscellaneous  
  
041 Nurse  
042 Dental Nurse  
043 General Nursing  
044 Midwife  
045 Pharmacy  
046 Physiotherapy  
047 Radiology  
048 Pediatric Nurse  
049 General Medical  
050 Ophthalmologist  
051 Throat-nose-ear Physician  
052 Neurologist  
053 Dermatologist  
054 Dietitian  
055 Miscellaneous  
  
056 Specialist  
057 Teacher/instructor  
058 Messenger  
059 Cook  
060 Gardener  
061 Shoemaker  
062 Tailor  
063 Barber  
064 Janitor  
065 Forester  
066 Sketcher

067 Security  
068 Lifeguard  
069 Parking Master  
070 Fire Brigade  
071 Physical Fitness  
072 Artist  
073 Clergy  
074 Laundry  
075 Ocean Tide  
076 Petro-chemical Technician  
077 Geography  
078 Miscellaneous

**20. GROUP CODE OF EDUCATION:**

000 General development  
001 National defense  
002 Joint command & staff college  
003 Command & staff college level  
004 2nd Officer continuing education level  
005 1st Officer continuing education level  
011 NCO continuing education  
  
100 Formation  
101 Military Academy level  
102 Fundamental Officer Education level  
103 Candidate Officer education level  
111 Candidate NCO education level  
112 Candidate Corporal education level  
113 Candidate Enlisted Education level  
  
200 Labour  
201 Labour education level  
  
300 General education  
301 University level  
302 Academy level  
303 Senior high school level

304 Junior high school level  
 305 Elementary school level (graduated)  
 306 Elementary school level (not graduated)  
  
 400 Specialist Military education  
 401 Specialist  
 402 Officer specialist  
 403 NCO specialist  
 404 Enlisted specialist  
 405 Civilian specialist  
  
 500 General Course

**21. ECHELON OF PROFESSION:**

11 Echelon 1-A	23 Echelon 2-C
12 Echelon 1-B	24 Echelon 2-D
13 Echelon 1-C	25 Echelon 2-E
14 Echelon 1-D	26 Echelon 2-F
15 Echelon 1-E	31 Echelon 3-A
16 Echelon 1-F	32 Echelon 3-B
17 Echelon 1-G	33 Echelon 3-C
18 Echelon 1-H	34 Echelon 3-D
21 Echelon 2-A	35 Echelon 3-E
22 Echelon 2-B	40 Functional

**22. STATION:**

Not included here for security reasons.

**23. VIOLATION / INFRINGE TYPE:**

1 Discipline	3 Negative data
2 Law	

**24. WHAT:**

This table will be completed later by Intelligence / Security officer, since the author does not have experience and data for this.

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